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It has been argued that, compared with the traditional graded form of school organization, the nongraded form is superior in developing pupil classroom behavior, attitudes, and achievement that are related to generally accepted educational objectives. To test the validity of this view, multivariate analyses of covariance were performed on one nongraded experimental group of 224 pupils and two traditional graded control groups totaling 483 pupils, all from the K-6 age range and divided into normal age, underage, and overage groups for purposes of analysis. Results indicate that (1) the nongraded form of organization encourages development of conceptual maturity and participation in group activities; (2) teachers in nongraded schools tend to be more accepting of disorderly pupil behavior; (3) the graded organization seems to encourage pupil development in achievement, attitude toward school, and contributing activities during teaching episodes; (4) overage pupils in the nongraded school seem to be more contributing members of their classes than overage pupils in graded schools; (5) underage pupils generally scored highest and overage lowest on the measures used; and (6) the research design seems appropriate for use in the evaluation of experimental programs. (TT)

THE RELATIONSHIP OF FORM OF SCHOOL ORGANIZATION TO PUPIL BEHAVIOR

Paper presented at AERA, February 7, 1969

Francis X. Vogel Norman D. Bowers

INTRODUCTION

In speculative writings it has been argued that, as compared with the traditional form of school organization, the nongraded form of school organization should be superior in developing pupil classroom behaviors that are related to generally accepted educational objectives. As is well known, in the traditional graded form of school organization, the pupils' ages are relatively constant and there is wide variability in achievement. The reverse is central to the nongraded organization. Wide variability occurs within each classroom regarding age and there is relative homogeneity of achievement. Comparisons of pupil attainment under these two forms of organization would provide important data regarding the validity of the notion of nongraded schools. The question investigated in this study was:

> Were there significant differences in the attitudes, achievement or classroom behavior of normal age, underage and overage pupils in multiage nongraded classes as compared with normal age, underage, and overage pupils in traditional graded classes?

DESIGN AND PROCEDURES

To secure information that might supply some insight on the question, three groups of teachers and their pupils were defined. The staff of an entire nongraded school encompassing the chronological ages found in a typical K-6 school, comprised the experimental group. The teachers in

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the control group were selected after all the teachers in the district teaching in K-6 graded schools were stratified on the basis of age, level taught, sex, training, and years of experience. The control teachers were chosen by a random process from the cells corresponding to the cells of the teachers in the experimental group.

The teachers in the experimental groups and control group one subsequently attended an intensive (T-Group) inservice program. Teachers in control group two did not attend the inservice program.

All of the pupils in the thirty classrooms who were present for at least one testing session were included in the sample. Utilizing definitions included in the handout, these pupils were identified as normal age, underage or overage. The number of normal age, underage and overage pupils in each school group is given in Table 1. Data collected from pupils included measures of cognitive maturity, achievement, attitudes, and classroom behavior both in standard group situations and in usual classroom activities, as listed in Table 2. Data were collected during the Fall of 1964, during the Winter of 1964, and finally in the Spring of 1965. Using the fall data as covariates, multivariate analyses of covariance were completed, followed by univariate analyses so that specific group differences might be located.

RESULTS

The results are summarized in Tables 3 through 9.

Significant differences were found for the interaction ($p < .05$), among the age groups ($p < .01$), and among the school groups ($p < .01$). (Table 3). Further analysis of the data indicated that two classroom observations scales were contributed to the significant interaction. A second multivariate analysis was performed that eliminated these two measures; significant differences were obtained for the two main effects:

age groups and school groups ($p<.01$). (Table 4)

As shown in Table 5, the univariate analyses utilizing measures on the school groups showed higher scores ($p<.01$) for the experimental group on measures of conceptual maturity, group planning and observations - non-contributing. Control group one had higher scores on measures of achievement ($p<.01$) attitudes ($p<.01$) and observations-contributing ($.01<p<.05$). Control group two had higher scores on the measure of operation-contributing ($p<.01$). There were no differences among the groups on the measure of group operations-non-contributing that were statistically significant.

As shown in Table 6, the univariate analyses performed to indicate directionality of the differences among the age groups revealed that the underage pupils had the highest scores and the overage pupils the lowest scores on the measures of achievement, group planning, and conceptual maturity ($p<.01$). For the scale of group operations-contributing, the overage pupils were the highest and the normal age the lowest ($.01<p<.05$). For the scale of observations-contributing, the normal age pupils scored the highest and the overage pupils the lowest ($p<.01$). For all other measures, no differences were found that were statistically significant.

DISCUSSION

A number of statements seem to be suggested by the data.

1. The nongraded form of organization appeared to encourage pupil development in conceptual maturity and participation in group activities. These findings would seem to provide considerable support for the idea that the nongraded school does indeed contribute to the development of certain pupil characteristics deemed valuable in our society: namely, conceptual maturity, and participation in group activities.

2. Teachers in the nongraded school apparently were more accepting of so-called "disorderly pupil behavior" than were teachers in the graded schools. The interpretation of this finding, particularly if a value judgment is made, probably is dependent upon the objectives and purposes of the school. If the school believes that pupils' interpersonal relations can be developed through an expression and understanding of feelings, then such things as whispering, laughing, and even hostility will be accepted. On the other hand, if the school feels that the expression of hostility is unacceptable and that pupils' behaviors should be more controlled, a high score on "disorderly pupil behavior" would not be desired.

3. The graded form of organization seemed to encourage pupil development in achievement, attitudes toward school, and contributing activities during usual teaching episodes. It might be that the instruments used for measuring these characteristics were more appropriate for use in traditional schools than for use with experimental programs. Also, it might be that as the nongraded school facilitated development of certain different kinds of pupil behaviors, the more traditional kinds of pupil behaviors were diminished. In other words, as the nongraded school facilitated development of conceptual maturity, group participation, and freer expression of feelings in the classroom, such behavior as achievement on traditional type tests, attentiveness to the teacher, and conventional attitudes toward school were diminished.

4. Although control group two (which did not participate in the inservice program) received the highest score on only one of eight measures, they rather consistently scored as the middle of the three groups. This, of course, raises questions about the "Hawthorne Effect" as it relates to short term experimental projects. Analysis of longitudinal data of

this project are planned to determine if this effect were lessened over time.

5. The differences among the age groups were generally as might be expected; either there were no significant differences on measures or the underage pupils scored highest and overage pupils lowest of the groups. These findings are consistent with most research studies related to grouping and promotion practices. In heterogeneous classes, brighter pupils tend to have higher scores on most measures of pupil behaviors than do the other pupils in the class. A study of the classroom behaviors of the various age groups of pupils within only nongraded classrooms would provide additional information about underage and overage pupils.

6. The overage pupils in the nongraded school seemed to be much more "contributing" members of their classes than were the overage pupils in the graded schools. It should be remembered that "contributing" was defined as activities which contribute to the classroom environment. It would seem that in the situation which was presumably oriented to the needs of each individual child, the teachers were better able to keep the overage pupils involved in the tasks at hand than were the teachers in the more traditional schools.

7. It would appear that although the observations of the underage pupils classified them as engaging in more "non-contributing" activities during usual teaching episodes than the normal age and overage pupils, the achievement, conceptual maturity, and participation in group activities of these underage pupils were not lowered. It would seem that the underage pupils were probably not stimulated sufficiently by the classroom activities, but at the same time were capable of learning much of what

the teachers were attempting to teach.

8. The effect of the intensive (T-Group) inservice program is not clear. The experimental group (which participated in the inservice program) had significantly higher scores on certain measures as reported earlier than did control group one (which also participated in the inservice program). However, a clinical study of the total program would make one wonder if there was perhaps some subtle, interaction between the learning of the teachers in the inservice program which combined to obtain these results.

As is rather well known, a number of nongraded programs have been started which met with limited success. Perhaps, one cause of these failures was the lack of preparation of the teachers to fully understand the philosophy and purpose of the nongraded plan of organization and to sufficiently improve communication among the teachers so that they could effectively individualize instruction.

9. The results obtained would seem to confirm the appropriateness of this design for evaluating experimental programs. For although it is readily apparent that many instruments presently available have limited value in evaluating experimental programs, there are instruments which can be used or used with modification quite successfully. The authors strongly believe that research of these kinds of experimental programs should be encouraged with the instruments and techniques at hand rather than, as has been suggested, not attempting to evaluate experimental programs until extensive instruments are developed for that purpose. The need for these kinds of programs are so great that to wait until adequate instruments are available will be to wait much too long; and to deny to the profession what results as can be obtained with present instruments and techniques would border on dereliction of professional responsibility.

TABLE I

THE NUMBER OF NORMAL AGE, UNDERAGE, AND OVERAGE PUPILS IN THE EXPERIMENTAL GROUP AND THE CONTROL GROUPS

	Experimental Group	Control Group One	Control Group Two
Normal Age	156	214	194
Underage	36	14	10
Overage	32	21	30

TABLE II

INSTRUMENTS UTILIZED IN THE COLLECTION OF DATA FROM PUPILS

A. Data Collected From Pupils

Achievement Measure
Stanford Achievement Test (Fall, 1964; Spring, 1965)

Attitude Measure
Describe Your School (Fall, 1964; Spring, 1965)

Conceptual Maturity
Draw-A-Man (Fall, 1964; Spring, 1965)
Draw-A-Woman (Fall, 1964; Spring, 1965)

B. Data Collected by Classroom Observation

Observation Schedule and Record (Fall, 1964; Winter and Spring, 1965)

Russell Sage Social Relations Test (Spring, 1965)

TABLE III

RESULTS OF THE MULTIVARIATE ANALYSIS OF COVARIANCE OF EIGHT DEPENDENT VARIABLES, ADJUSTED FOR INITIAL DIFFERENCES ON MEASURES OF ACHIEVEMENT, ATTITUDES, AND CONCEPTUAL MATURITY

Main Effects	df	F
School Groups	2	6.97**
Age Groups	2	3.18**
Interaction	32	1.69**
Error	695	
Total	731	

**$P < .01$

TABLE IV

RESULTS OF THE MULTIVARIATE ANALYSIS OF COVARIANCE WITH SIX DEPENDENT VARIABLES, ADJUSTED FOR INITIAL DIFFERENCES ON MEASURES OF ACHIEVEMENT, ATTITUDES, AND CONCEPTUAL MATURITY

Main Effects	df	F
School Groups	2	6.09**
Age Groups	2	2.92**
Interaction	24	1.02
Error	695	
Total	723	

**$P < .01$

TABLE V

SUMMARY OF THE UNIVARIATE ANALYSES OF COVARIANCE FOR EIGHT MEASURES, HOLDING CONSTANT INITIAL SCORES ON MEASURES OF ACHIEVEMENT, ATTITUDE, AND CONCEPTUAL MATURITY

Measure	Mean Squares			
	School Group (df = 2)	Age Group (df = 2)	Interaction (df = 32)	Error (df=695)
Stanford Achievement Test Composite	224.25**	214.75**	66.95	42.97
Russell Sage Social Relations Test, Planning	6.68**	4.37**	1.51	.92
Russell Sage Social Relations Test, Operations Contributing	11.88**	6.98*	1.24	2.11
Russell Sage Social Relations Test, Operations Non-Contributing	2.15	6.21	3.97	3.23
Observation Schedule and Record, Contributing	11.68*	13.40**	12.77**	2.70
Observation Schedule and Record, Non-Contributing	55.41**	1.81	9.07*	2.84
Describe Your School	635.52**	24.64	16.19	56.49
Draw-A-Person	2809.89**	2941.33**	351.64	490.08

* $.01 < P < .05$

** $p < .01$

TABLE VI

MEAN SCORES ON EACH MEASURE FOR THE EXPERIMENTAL GROUP AND THE CONTROL GROUPS, ADJUSTED FOR INITIAL DIFFERENCES ON MEASURES OF ACHIEVEMENT, ATTITUDE, AND CONCEPTUAL MATURITY

	Experimental Group (N=224)	Control Group One (N=249)	Control Group Two (N=234)
Stanford Achievement Test Composite	48.20	50.82	49.94
Russell Sage Social Relations Test, Planning	1.73	1.41	1.67
Russell Sage Social Relations Test, Operations Contributing	1.93	1.60	2.05
Russell Sage Social Relations Test, Operations, Non-Contributing	2.23	2.06	2.06
Observation Schedule and Record, Contributing	1.94	2.41	2.32
Observation Schedule and Record, Non-Contributing	2.16	1.21	1.30
Describe Your School	35.39	38.94	38.03
Draw-A-Person	208.76	201.86	203.71

TABLE VII

MEAN SCORES ON EACH MEASURE FOR THE NORMAL AGE, UNDERAGE, AND OVERAGE GROUPS ADJUSTED FOR INITIAL DIFFERENCES ON MEASURES OF ACHIEVEMENT, ATTITUDE, AND CONCEPTUAL MATURITY

	MEANS		
	Normal Age Group (N=370)	Underage Group (N=50)	Overage Group (N=53)
Stanford Achievement Test Composite	50.03	51.44	47.94
Russell Sage Social Relations Test, Planning	1.59	1.93	1.44
Russell Sage Social Relations Test, Operations, Contributing	1.79	2.03	2.12
Russell Sage Social Relations Test, Operations Non-Contributing	2.13	1.71	2.32
Observation Schedule and Record, Contributing	2.33	1.87	1.83
Observation Schedule and Record, Non-Contributing	1.51	1.74	1.64
Describe Your School	37.68	36.77	37.32
Draw-A-Person	204.26	214.05	201.33

TABLE VIII

MEAN SCORES AND STANDARD DEVIATIONS FOR THE ENTIRE SAMPLE OF 707 PUPILS ON EACH MEASURE, WITH MEAN SCORES ADJUSTED FOR INITIAL DIFFERENCES ON MEASURES OF ACHIEVEMENT, ATTITUDES AND CONCEPTUAL MATURITY

	Mean	Standard Deviation
Standard Achievement Test Composite	49.90	6.55
Russell Sage Social Relations Test, Planning	1.60	.06
Russell Sage Social Relations Test, Operations Contributing	1.87	1.45
Russell Sage Social Relations Test, Operations Non-Contributing	2.12	1.79
Observation Schedule and Record, Contributing	2.23	1.64
Observation Schedule and Record, Non-Contributing	1.54	1.68
Describe Your School	37.56	7.51
Draw-A-Person	204.75	22.13

TABLE IX

MEAN SCORES ON EACH MEASURE FOR AGE GROUPS WITHIN SCHOOL GROUPS ADJUSTED FOR INITIAL DIFFERENCES ON MEASURES OF ACHIEVEMENT, ATTITUDE, AND CONCEPTUAL MATURITY

Measure	Means		
	Experimental Group One (N=224)	Experimental Group Two (N=248)	Control Group (N=234)
NORMAL AGE			
Stanford Achievement Test Composite	48.44	50.86	50.38
Russell Sage Social Relations Test, Planning	1.69	1.41	1.70
Russell Sage Social Relations Test, Operations Contributing	1.76	1.62	2.03
Russell Sage Social Relations Test, Operations Non-Contributing	2.18	2.13	2.09
Observation Schedule and Record, Contributing	1.93	2.52	2.45
Observation Schedule and Record, Non-Contributing	2.05	1.32	1.29
Describe Your School	35.50	38.81	38.17
Draw-A-Person	208.33	201.36	204.19
UNDERAGE			
Stanford Achievement Test Composite	51.74	53.37	47.65
Russell Sage Social Relations Test, Planning	1.99	2.12	1.53
Russell Sage Social Relations Test, Operations Contributing	2.46	1.77	2.06
Russell Sage Social Relations Test, Operations Non-Contributing	2.09	.94	1.44
Observation Schedule and Record, Contributing	1.55	2.13	2.65
Observation Schedule and Record, Non-contributing	2.62	-----	1.04
Describe Your School	35.66	39.94	36.31
Draw-A-Person	214.57	209.91	218.00

TABLE IX (Continued)

Measure	Means		
	Experimental Group One (N=224)	Experimental Group Two (N=248)	Control Group (N=234)
	OVERAGE		
Stanford Achievement Test Composite	47.25	44.08	47.89
Russell Sage Social Relations Test, Planning	1.65	1.00	1.56
Russell Sage Social Relations Test, Operations Contributing	2.17	1.69	2.36
Russell Sage Social Relations Test, Operations Non-Contributing	2.74	2.04	2.07
Observation Schedule and Record, Contributing	2.51	1.45	1.36
Observation Schedule and Record, Non-Contributing	2.26	.95	1.45
Describe Your School	35.48	39.63	37.93
Draw-A-Person	206.24	201.58	195.93

ADDENDUM

LIST OF TERMS

Nongraded.-- Nongraded refers to a school program in which the course of study is organized in a continuous manner with no time restrictions for completion of any unit. A child is able to progress from one unit to the next at any time during the school year. In addition, all grade labels are removed from the school and the course of study, and classes are characterized by multiage groupings.

Graded.-- Graded refers to a school program in which the course of study is organized into units with definite time restrictions for each unit. A child does not normally move into the units of the next grade until he is chronologically the correct age for that grade. A child is also expected to complete a certain portion of the course of study in each academic year.

Operational Definitions.-- The following definitions have been defined operationally for the purpose of this study. The complete absence of research studies concerned with overage and underage pupils in a nongraded class has resulted in a void of definitions of normal age, underage and overage as these terms apply to nongraded classes.

Normal age.-- In graded classes, normal age refers to pupils born during the calendar year which is normal for that grade. In nongraded classes, normal age refers to pupils born up to six months before or after the median birthdate of the class.

Underage.-- In graded classes, underage refers to pupils born after the calendar year which is normal for that grade. In nongraded classes, underage refers to pupils born more than six months after the median birthdate of that class.

Overage.-- In graded classes, overage refers to pupils born before the calendar year which is normal for that grade. In nongraded classes, overage refers to pupils born more than six months before the median birthdate of that class.